

Appl. No. 10/538,284
Amendment dated: September 3, 2008
Reply to OA of: April 3, 2008

REMARKS

At the outset, Applicants thank the Examiner for the review and consideration of the pending Office Action. The Final Office Action dated April 3, 2008 has been considered and its contents reviewed. Applicants request reconsideration of the Examiner's position in view of the following amendments and remarks.

1. **Amendments and Support for Same.**

Applicants have amended the claims as noted to more particularly define the invention in view of the outstanding Official Action. Applicants have amended claims 1, 4, 6, and 9-13 to better define the invention and as fully supported by the Specification as would be appreciated by one of ordinary skill in the art to which the invention pertains. Applicants submit that the claims now present in the application are fully supported by the Specification as originally filed and no new matter is introduced.

Applicants most respectfully submit that all of the claims now present in the application are in full compliance with 35 USC §112 and clearly patentable over the references of record.

2. **Examiner Interview.**

Applicants thank the Examiner for courtesies extended during a telephone Examiner interview on July 21, 2008.

Applicants have not yet received a copy of the Examiner Interview and no copy is indicated as having been mailed out in the PAIR system as of September 3, 2008.

During the interview, the rejections of record and prior art were discussed.

Applicants have filed this Request for Continued Examination including the claim amendments as noted because it is believed that such amendments would have raised issues requiring further search and consideration by the Examiner.

3. Claims 1, 2, 6 and 7 are rejected under 35 U.S.C. §102(b) as anticipated by United States patent application publication 2001/0028037 (Suzuki).

The rejection of claims 1 and 2 is respectfully traversed and reconsideration is requested.

Claims 1 and 2 are allowable over *Suzuki* in that each of these claims recite, “an aperture configured in the center of the extractor so that electrons from an emitter can be passed through.”

Suzuki is drawn to a hollow beam emitter where the center of the beam is blocked and does not have an aperture as presently claimed in at least claim 1. As can be seen in *Suzuki* Figures 1(A) and 1(B), a thick portion (1b) exists in the center of the hollow beam aperture. Further, in *Suzuki*, a hollow beam is formed by an electron electrode after the effective electron beam is formed.

Turning to the purpose of the present invention, a discussion of the problems with the prior art is presented. Referring to Applicant’s Figure 1, the extraction electrode has an aperture and the aperture must be aligned on the electron optic axis.

The typical components of an electron optical column (120) include a micro-source lens (122) with an extractor (124) and an anode (128) with apertures of approximately a few micrometers and 100 micrometers in diameter, respectively. The extractor (124) as an extraction electrode is fabricated from a few hundred micrometers thick silicon (Si) membrane with a bore diameter of a few microns. For an optimum lense operation, the electron emitter tip (112) is required to be positioned very closely and precisely aligned to the extractor hole (126)(Specification pages 2-3).

Due to the proximity of the emitter source (110) to extractor (124), aligning the electron emitter tip (112) with the extractor hole (126) is difficult (Specification page 3).

The problem is exacerbated by the dimension of the extractor hole (126) and the overall column dimension. For fine alignment, an STM-type X-Y positioner has been used in vacuum state to scan the tip over the extractor electrode. However, because the location of the electron emitter tip is not easily and precisely measured, this approach requires so much time for alignment with the extractor hole (Specification page 3).

Accordingly, there is a need for a method to easily and precisely align an electron emitter and an extractor hole of a micro-column. In this regard, International patent application PCT/US1999/25430 proposed the alignment method. However, because the proposed application makes use of four V-grooves for performing the alignment, it requires additional components for precise alignment within a vacuum space, even if such components are exempted out of the vacuum space (Specification page 3).

Further, as the alignment between the electron emitter and the extractor hole may be changed after a long use of the micro-column, it is very difficult to sense such change of alignment (Specification page 3).

In the case of the micro-column, since the object to be measured and/or aligned is very small and requires precise measurement and alignment, it is necessary to repeat the measuring and/or aligning operation. Thus, it takes a lot of time, in addition to being expensive, for carrying out the measurement and alignment. Also, it is more difficult to determine and calibrate the assembled micro-column during use (Specification page 3).

Furthermore, a typical micro-column does not relate to making a hollow beam. Although a micro-column can make a hollow beam, an extraction electrode cannot have a role of forming a hollow beam. The extractor allows the electron to easily pass through the extractor aperture or hole from an electron emitter to make an effective electron beam.

Finally, an extractor cannot relate to a hollow beam. If in a micro-column, a hollow beam could be formed since the extractor is the nearest electron electrode from an electron emitter, another electron electrode must form a hollow beam.

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In view of the above, it is clear that *Suzuki* does not anticipate nor render obvious the claimed invention.

Withdrawal of the rejection of claims 1 and 2 is respectfully requested.

Turning to claims 6 and 7, Applicants' arguments with respect to the rejection of claims 1 and 2 apply equally to the rejection of claims 6 and 7.

Withdrawal of the rejection of claims 6 and 7 is respectfully requested.

4. Claims 4, 5 and 9-13 are rejected under 35 U.S.C. §103(a) unpatentable over United States patent application publication 2001/0028037 (*Suzuki*).

The rejection of claims 4 and 5 is respectfully traversed and reconsideration is requested.

Claims 4 and 5 recite at least, "sensing the electron beam emitted from the electron emitter at each of the sensing regions of the extractor as claimed in claim 1."

Applicants' arguments with respect to the rejection of claims 1 and 2 apply equally to the rejection of claims 4 and 5.

Withdrawal of the rejection of claims 4 and 5 is respectfully requested.

Turning to claims 9-13, the Examiner states, "Suzuki discloses the device used in these method claims, as described above regarding claims 1 and 6 (Office Action at page 5)."

For reasons as already noted with regard to the rejection of claims 1 and 6, Applicant respectfully disagrees with the Examiner.

Applicants' arguments with respect to the rejection of claims 1 and 6 apply equally to the rejection of claims 9-13.

Withdrawal of the rejection of claims 9-13 is respectfully requested.

5. Claims 3 and 8 are rejected under 35 U.S.C. §103(a) unpatentable over United States patent application publication 2001/0028037 (*Suzuki*) in view of United States patent 5,122,663 (*Chang*).

The rejection of claims 3 and 8 is respectfully traversed and reconsideration is requested.

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Claims 3 and 8 depend from claims 1 and 6 respectively and necessarily contain all of the limitations of those claims.

Furthermore, *Chang* is directed to a compact integrated electron beam imaging system. As best presently understood, *Chang* is not directed towards measurement and or calculation of an amount of electrons.

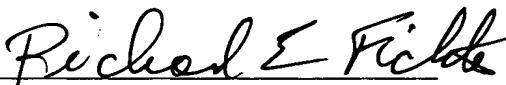
Considering the combination of *Suzuki* and *Chang*, the combination does not render the claimed invention *prima facie* obvious.

Withdrawal of the rejection of claims 3 and 8 is respectfully requested.

6. Conclusion.

In view of the above comments and further amendments to the claims, favorable reconsideration and allowance of all the claims now present in the application are most respectfully requested.

Respectfully submitted,
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